

1 We Claim:

1. A load change safety system for a sheet stacker having a stacking deck formed with a discharge end for discharging sheet material onto and building sheet stacks on a conveying sheet material removal system formed with a  
5 receiving means comprising:
  - a. a variable pinch point gap formed by relative motion between said discharge end of said stacking deck of said sheet stacker and said receiving means of said conveying sheet material removal system; and
  - 10 b. redundant means for selectively preventing a decrease in said variable pinch point gap.
2. A load change safety system as described in claim 1 comprising:
  - a. said redundant means includes a plurality of hydraulic cylinders for raising and lowering said stacking deck;
  - b. said hydraulic cylinders are of adequate strength such that  
15 should one cylinder fail to provide support for said stacking deck, the remaining cylinder(s) can support the weight of said stacking deck;
  - c. a plurality of valves, wherein at least one valve is independently connected to each of said cylinders, which may selectively and alternatively permit and prevent flow of fluid from those of said hydraulic  
20 cylinder(s) which are operating normally and have not failed, thereby resulting in rapidly preventing said variable pinch point gap from narrowing; and
  - d. control means operatively and independently connected to each of said valves for alternatively permitting and preventing flow of fluid  
25 from said hydraulic cylinders.
3. A load change safety system as described in claim 2 wherein:
  - a. said plurality of hydraulic cylinders for raising and lowering said stacking deck is limited to a pair of hydraulic cylinders.

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- 1 4. A load change safety system as described in claim 1 comprising:
- a. said conveying sheet material removal system includes an elevating platform 16' and
  - b. said redundant means include one or more hydraulic cylinders
  - 5 for raising and lowering elevating platform
  - c. a plurality of valves, wherein said valves are operatively connected to each other and said cylinder(s) by means such that all of said valves must simultaneously be activated and operate normally for se-
  - 10 lectively and alternatively permitting and prevent flow into said hydraulic cylinder(s) which are operating normally and have not failed, thereby preventing said variable pinch point gap from narrowing; and
  - d. control means operatively and independently connected to each of said valves, for alternatively permitting and preventing flow of fluid into said hydraulic cylinders.
- 15 5. A load change safety system as described in claim 1 wherein:
- a. said redundant means includes control means for detecting an event requiring activation of said redundant means
6. A load change safety system as described in claim 5 comprising:
- a. sensor means;
  - 20 b. said sensor means include hydraulic position sensors operatively connected to said hydraulic cylinders for detecting a condition requiring activation of said hydraulic cylinders;
  - c. each of said hydraulic position sensors is individually and independently operatively connected to said control means and to said stacking deck;
  - 25 d. said hydraulic position sensors having a first position activated by a predefined raised position of an associated hydraulic cylinder ; and
  - e. said hydraulic position sensors having a second position activated by a loss of support of associated hydraulic cylinder due to a malfunc-
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- 1        tion where hydraulic cylinders are operatively connected to said  
stacking deck where said control means signal to said plurality of  
valves to prevent flow of fluid from said hydraulic cylinders, thereby  
preventing said variable pinch point gap from decreasing.
- 5        7. A load change safety system for a sheet stacker as described in claim 1  
comprising:
- 10        a. an electro-optical light guard means operably connected to said  
redundant means with one or more redirections of one or more light  
beams to create a light guard perimeter for guarding portions of said  
sheet stacker and portions of said conveying sheet material removal  
system;
- 15        b. said electro-optical light guard means including one or more light  
beam transmitters and one or more light beam receivers; and  
c. said electro-optical light guard means including one or more optical  
repeating nodes using an optical receiver and an optical transmitter for  
creating the redirection of said light beam(s).
- 20        8. A load change safety system as described in claim 7 comprising:
- 25        a. said redundant means includes a plurality of hydraulic cylinders for  
raising and lowering said stacking deck;
- 30        b. said hydraulic cylinders are of adequate strength such that should  
one cylinder fail to provide support for said stacking deck, the remain-  
ing cylinder(s) can support the weight of said stacking deck;
- c. a plurality of valves, wherein at least one valve is independently  
connected to each of said cylinders, which may selectively and alter  
natively permit and prevent flow of fluid from those of said hydraulic  
cylinder(s) which are operating normally and have not failed, thereby  
resulting in rapidly preventing said variable pinch point gap from  
narrowing; and
- d. light guard control means operatively connected to said electro-  
optical light guard means and operatively and independently connected

1 to each of said valves for alternatively permitting and preventing flow  
of fluid from said hydraulic cylinders.

9. A load change safety system as described in claim 7 comprising:

- 5 a. said redundant means include one or more hydraulic cylinders  
for raising and lowering elevating platform of said conveying sheet  
material removal system.
- 10 b. a plurality of valves, wherein said valves are operatively connected  
to each other and said cylinder(s) by means such that all of said  
valves must simultaneously be activated and operate normally for  
selectively and alternatively permitting and prevent flow into said  
hydraulic cylinder(s) which are operating normally and have not failed,  
thereby preventing said variable pinch point gap from narrowing; and
- 15 c. light guard control means operatively connected to said electro-  
optical light guard means and operatively and independently connected  
to each of said valves for alternatively permitting and preventing flow  
of fluid into said hydraulic cylinders.

10. A load change safety system for a sheet stacker as described in claim 7  
comprising:

- 20 a. said one or more light beam transmitters include modulating  
transmitter means for creating a modulated optical signal;
- b. said light beam receivers include modulated signal detection means  
for receiving and determining that a selected modulated optical signal  
is being received; and
- 25 c. said modulated signal detection means is constructed such that  
blockage of said light guard perimeter and/or any failure of said  
electro-optical light guard means result in same light guard output  
signal.

11. A load change safety system for a sheet stacker as described in claim 7  
comprising:

- 1 a. remote control means operably connected to said sheet stacker  
allowing the operator to selectively allow the reduction of said  
variable pinch point gap;
- 5 b. said remote control means is mounted on a boom which is swivelly  
attached to or adjacent to said sheet stacker; and one of said optical  
repeating nodes is mounted on the movable part of said boom as part  
of said light guard perimeter.

12. A load change safety system for a sheet stacker as described in claim 7  
10 comprising:

- 15 a. said light guard means including optical repeating nodes which are  
selectively located at stations so that the light beam(s) crossing con-  
veying sheet material removal system between stations is at least a  
minimum distance from said discharge end of said stacking deck of  
said sheet stacker to allow one or more completed full stacks to be  
transported far enough to allow said stacking deck to lower and begin  
building a second full stack without blocking said light beam(s) cross-  
ing said conveying sheet material removal system; and
- 20 b. said conveying sheet material removal system includes a travel  
limit control means by which said one or more full stacks are  
automatically stopped at a position assuring that they do not block  
said light beam(s) crossing said conveying sheet material removal  
system once transported just short of said minimum distance in order  
to allow said stacking deck to lower to begin another full stack.

13. A load change safety system for a sheet stacker as described in claim 12  
wherein:

- 25 a. said conveying sheet material removal system includes a manual  
load release control actuated by an operator to permit said complete  
full stack(s) to travel through and downstream of said location of said  
light beam(s) crossing said sheet material removal system between  
said optical repeating nodes located at said stations.

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1 14. A load change safety system for a sheet stacker as described in claim 12  
wherein:

5 a. said travel limit control means of said sheet material removal system is operably connected to light guard control means to release said complete full stack(s) to travel through and downstream of said location of said light beam(s) crossing said sheet material removal system after said stacking deck has made its full down cycle.

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